COASTAL CONNECTIONS

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COASTAL MANAGEMENT PROFILE

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Hometown: Scituate, Massachusetts
Education: Bachelor of arts in history, Bowdoin College; master of arts in teaching, Brown University
Most fulfilling aspect of your job: What really intrigues me about this job is how varied it is. It's part resource protection, part outreach and research, part maritime development and urban planning, and part coalition-building.
Most challenging aspect of your job: Balancing all those parts
Things you do in your spare time: Rowing, kayaking, sailing
Favorite movie: *My Sweet Little Village* (*Vesnicko Má Stredisková*), a wonderful Czechoslovak film
In your CD player right now: *Sea of No Cares* by Great Big Sea, a band from

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THIS ISSUE'S FOCUS

REMOTE SENSING

Remote sensing technology is becoming increasingly useful in coastal resource management. The following information is a guide for coastal managers who want to explore remote sensing but aren't quite sure how to begin. Additional information can also be found in the publication *Coastal Remote Sensing: A Coastal Resource Manager's Guide*. See page 2 of this newsletter for more information.

What Is Remote Sensing?

Remote sensing is the science of gathering information from a distance, and it provides a descriptive, analytical way to identify geographic features. Remote sensing uses such technology as aerial photography and satellite imagery to record information about features on the land and in the water, acoustic sensors to measure water depths and map the seafloor, and LIDAR (light detection and ranging) and IfSAR (Interferometric Synthetic Aperture Radar) to measure elevation.

Why Use Remote Sensing?

While more traditional survey methods are useful in many situations, remote sensing is often the most efficient method for gathering data across a large area. Some of its benefits include the following:

It's comprehensive. Conventional survey methods are often the best way to collect very detailed information about a specific area. But if you need information about the big picture, remote sensing can provide a more comprehensive view. Sampling at specific sites can tell you exactly what is going on at those sites but can miss things between the sites. Remote sensing can help fill in those gaps to supplement the site data.

It allows access. Since remote sensing data can be obtained from airplanes and satellites, researchers can collect data on areas otherwise too far away, too difficult to traverse, or too large to manage.

It captures the moment. Remotely sensed data depict an area at a specific moment in time. Because surveying a large area with traditional methods can take weeks to even years to complete, changes may have already occurred in the landscape by the time you finish. This record of a place at a particular moment can also be used in the future for comparisons of the same area over time.

How Can I Use Remote Sensing?

Coastal programs can use remote sensing for a variety of activities, from mapping shorelines to monitoring water quality.

Delaware's Coastal Programs recently used the acoustic system RoxAnn™ to map submerged aquatic vegetation throughout inland bays. "We have a lot of problems with *Ulva* [sea lettuce]," says Dave Carter, environmental program manager for the state. "In response, we brought in two harvesters

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St. John's, Newfoundland

Remote sensing projects: We've been involved in several projects, including mapping submerged aquatic vegetation and land cover change.

Boston, Slovakia, Boston. That's the route that brought Tom Skinner to a job in coastal resource management. Although he has served as director of the Massachusetts Office of Coastal Zone Management (CZM) for the last four years, Tom began his career focused on the land. After working in land acquisition for five years, Tom took a job as a planning consultant in Bratislava, Slovakia. After one-and-a-half years there, he was offered the job with the Massachusetts CZM program, where he "made the switch from a land-locked country to the coast."

Under Tom's direction, the CZM has been quite a productive agency. Recently, much of its time has been dedicated to Governor Mitt Romney's ocean management initiative, a program to develop an overall framework, as well as regional plans, for managing the state's ocean resources.

When he's not managing state waters, you might find Tom playing in them. A seasoned rower, he has competed several times in the annual Head of the Charles, a rowing competition on the Charles River in Boston that draws competitors from around the world. But for now, Tom has hung up his rowing oars: "Age and infirmity have caught up with me, so now I'm content to kayak and sail." Tom now lives in Gloucester, Massachusetts.

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[to remove the sea lettuce] and realized we were pulling up crabs."

The programs used the acoustic sensor to determine where and to what extent they should focus their harvesting activities to eliminate the sea lettuce while protecting the natural habitat. In addition, the Delaware Coastal Programs plan to map the entire bottom area of Delaware Bay using remote sensing technologies. "Delaware's waters are pretty murky," notes Carter. "We can use remote sensing data to see the impacts of dredging, help with borrow site selection, and detect land cover change for subaqueous bottoms."

What Do I Need to Consider before Buying Data?

Acquiring the appropriate data for your needs involves considerable thought and planning. Here are some important factors to bear in mind.

Resolution. Consider the amount of detail you need before you buy data—the more detail recorded by a sensor (the resolution), the less area that is generally covered. Also, higher resolution often means higher data costs.

Requirements. Depending on what kind of data you're looking for and where they come from, there may be software, hardware, or licensing restrictions on their use. Be sure to check that you have all the necessary equipment for using a data set, that you can access it in its delivered format, and that you are allowed to share it with partners.

Costs and benefits. Always research your data options and needs before buying. If remotely sensed data will cost your agency three times as much as other data and will not provide all the details you need, then perhaps remote sensing is not the best option for your project. Using a combination of remote sensing data and other sources of information and data can often provide the most useful information in the most cost-effective manner.

The examples used here are a mere sampling of the various advantages and considerations associated with using remote sensing for coastal management issues. However, remote sensing may not be right for every program or for every project. "Getting started is expensive and time consuming," warns Carter. "But don't let that scare you away. Remote sensing provides critical landscape-scale information that guides management very cost-effectively. And that's what matters most to me."

New Coastal Resource Manager's Guide to Remote Sensing

Using short stories and nontechnical language, *Coastal Remote Sensing: A Coastal Resource Manager's Guide* profiles remote sensing in action. Stories in the book include how

- aerial photography provided the evidence needed to improve the clam dredging regulations in Virginia
- agencies in the North Pacific Ocean use satellite imagery to recommend fishing areas to help protect endangered sea turtles
- elevation data are helping southern California preserve and restore wetlands

Stories like these, along with basic information about remote sensing, provide an informative overview for coastal resource managers. To request a free copy of *Coastal Remote Sensing*, complete the on-line request form at *www.csc.noaa.gov/clearinghouse/*.

The NOAA Coastal Services Center also offers training in remote sensing. Visit *www.csc.noaa.gov/crs/rs_training.html* for more information.

Other Common Uses for Remote Sensing

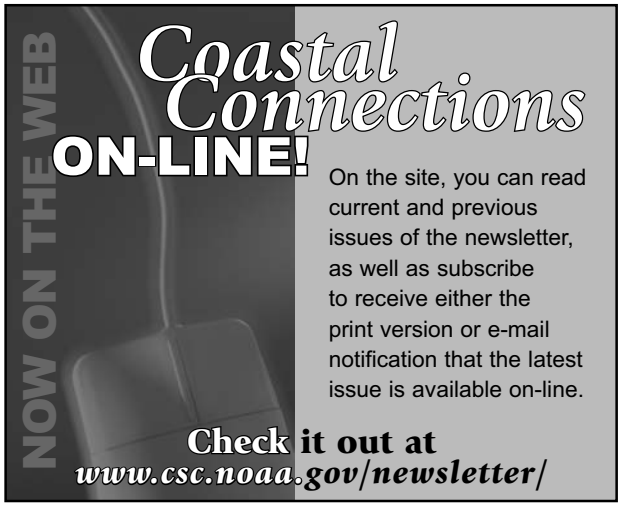
Remotely sensed data are regularly used by coastal managers for such applications as mapping land cover and detecting shoreline change. But many other fields also use the technology for a variety of purposes. Here are just a few examples.

Shipping. Several types of remote sensing data were used to develop, and are used to update, bathymetry information for U.S. nautical charts. Both commercial and recreational boaters need this information to navigate safely.

Weather forecasting. Satellite data sources are used for identifying and tracking potentially disastrous storm events and can be used to measure water vapor in the atmosphere. To help predict the course of an El Niño event, sea surface temperature data and information gathered from buoys assist in long-term tracking.

Search and rescue. Satellite-aided tracking systems help rescuers respond to land or sea distress signals, and sonar has been used to help locate shipwrecks and airplane wrecks, such as TWA Flight 800 and EgyptAir Flight 990.

Protecting wildlife. Remote sensing helps resource managers protect threatened and endangered species. Turtles, manatees, seals, whales, and other animals are tagged so that the Global Positioning System (GPS) can monitor where they live and forage.



Archaeology. Underwater remote sensing technology has been used to help locate historic shipwrecks such as the *Titanic*, USS *Monitor*, and CSS *Hunley*. It can also provide detailed imagery of such ships' condition in deep water.

Coastal observation. When combined with other technologies such as buoys and geographic information systems, remote sensing presents a regional, comprehensive analysis of the nation's coasts. This analysis provides insight into the relationship between land and water.

Selecting a Source: Where to Find Data

Often the hardest part of acquiring remotely sensed data is finding what you need. A good place to start is the Web site, Coastal Geospatial Information: Examples of Internet Resources, located at *www.csc.noaa.gov/products/datasites/*. This site provides links to all kinds of remote sensing data sources from federal clearinghouses to individual state data Web sites. You can also try typing "remote sensing" or the type of data you're looking for into your favorite search engine. You may find exactly the data source you need.

If you're looking to gather new data, here are a few ways to find sources or providers:

- Look for Web links to public or private on-line data sources, vendors, or contractors on the Web sites of remote sensing professional organizations such as the American Society for Photogrammetry & Remote Sensing (*www.asprs.org*).
- Go to remote sensing or geospatial conferences and talk to the data vendors. They can show you example data and walk you through the process.
- Check sites for on-line ordering. Many companies allow you to preview, order, and access data from their Web sites. Some providers even allow you to submit data acquisition requests on-line.

Be sure whenever you acquire data that you also get metadata—documentation about the data—no matter where the data come from. That way you'll have information on the data's projection and resolution, as well as on how they were created, processed, and stored.

Coastal Connections is a publication of the National Oceanic and Atmospheric Administration Coastal Services Center, produced for the coastal resource management community. Each issue of this free bimonthly newsletter focuses on a tool, information resource, or methodology of interest to the nation's coastal resource managers.

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NEWS AND NOTES

Web Site Offers Real-Time Coastal Information

nowCoast, a Web portal hosted by NOAA, provides spatially referenced links to real-time information from meteorological and oceanographic networks, as well as NOAA's weather and marine forecasts and forecast model guidance. The newest version of nowCoast is now available at *http://nauticalcharts.noaa.gov*.

National Environmental Methods Index Available

The U.S. Environmental Protection Agency and U.S. Geological Survey recently released the National Environmental Methods Index, a free, Web-searchable database of environmental monitoring methods that allows agencies to share monitoring data. For more, visit *www.nemi.gov*.

Massachusetts Launches New Training Program

In May, the Waquoit Bay National Estuarine Research Reserve introduced the first coastal training program in the U.S. The program is the first step in the national reserve system's efforts to provide current information and skill-building opportunities on coastal issues. Similar training programs are planned for each of the 25 reserves. For more information, visit *www.coastaltraining.org*.

Transitions

Jennifer Hunter is now the director of the New Hampshire Estuaries Project, replacing **Cynthia McLaren**… **Naomi McIntosh** has been selected as manager of NOAA's Hawaiian Islands Humpback Whale National Marine Sanctuary… **Michael Molnar** is the new manager of the Indiana Lake Michigan Coastal Program. He replaces **Laurie Rounds**… **Jim Tabor** has retired as manager of the Pennsylvania Coastal Zone Management Program. No replacement had been named at the time of printing… **Steve Tilley** is the new deputy director of the Commonwealth of the Northern Mariana Islands Coastal Resource Management Office, replacing **Kerry Pate**.

Accolades

Scientific American awarded the NOAA Ocean Explorer Web site (*http://oceanexplorer.noaa.gov*) one of its 2003 Sci/Tech Web Awards. The site provides public access to many of NOAA's marine activities.

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